RECEIVED
CENTRAL FAX CENTER
FEB 01 2006

Customer No. 27061
Conf. No. 1702

Attorney Docket No. GEMS8081.192

Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Toth et al.
Serial No.	:	10/765,582
Filed	:	January 27, 2004
For	:	**SYSTEM AND METHOD OF X-RAY FLUX MANAGEMENT CONTROL**
Group Art No.	:	2882
Examiner	:	Kao, C.

CERTIFICATION UNDER 37 CFR 1.8(a) and 1.10

I hereby certify that, on the date shown below, this correspondence is being:

Mailing

□ deposited with the US Postal Service in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

37 CFR 1.8(a) **37 CFR 1.10**

□ with sufficient postage as first class mail □ As "Express Mail Post Office to Addressee" Mailing Label No.

Transmission

■ transmitted by facsimile No. 571-273-8300 addressed to Examiner Kao at the Patent and Trademark Office.

Date: February 1, 2006

Jessica A. Calaway
Signature

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Dear Sir:

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request. However, Applicant did file under separate cover an after-final amendment correcting claims that were objected as to their form. It is believed the after-final amendments made on February 1, 2006 place the application in better condition for appeal. The request is being filed with a Notice of Appeal. The review is requested for the reasons set forth hereinafter.

REMARKS

Claims 1-30 are pending in the present application.

Claims 1-15 stand rejected as failing to comply with the written description requirement of 35 U.S.C. §112. It is well-established that "[t]o satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention." MPEP §2163, I. Applying this standard, it is clear that amendatory language added to claim 1 is supported by the specification. While Applicant believes that a skilled artisan would readily appreciate that the invention, when embodied in a method, includes the step of "comparing a position of a subject in a scanning bay relative to a reference position," as called for in claim 1, Applicant refers the Examiner to the description of Fig. 11 in the specification. Specifically, Applicant, in describing a method for adjusting pre-imaging and imaging parameters, discloses that "from the two scout scans a centroid projection 302 is made" and "the distance of the centroid from a point of reference is made." Application, p. 17, l. 30 – p. 18, l. 3. The specification further states that "the distance of the centroid from the point of reference is used to geometrically calculate an x and y centering error for the patient relative to a reference position 304." Application, p. 18, ll. 9-10. A skilled artisan will conclude that to determine a "distance" is to make a comparison. That is, distance is "the length of the space separating two people, places, or things," as defined by Encarta® World Dictionary at www. encarta.msn.com (copy previously made of record). Thus, to determine the distance, by definition, includes a step of comparison. Accordingly, claim 1 is believed supported by the specification. Withdrawal of the rejection thereto under 35 U.S.C. §112, first paragraph, is therefore requested.

Regarding claim 1, the art of record fails to teach or suggest a method of diagnostic imaging whereby a region of maximum attenuation of a subject is determined from the comparison of a position of the subject in a scanning bay with a reference position, and the subsequent automatic adjustment of an attenuation filter based on the determined region of maximum attenuation. The art of record teaches an edge detection technique inherent with the drawbacks set forth in the Background of the Invention section of the present application.

Specifically, Moore teaches a strip of parallel light on one side of a subject and an array of light detectors on opposite side of the subject. The strip of light emits light toward the subject and light detectors and "the outputs of detectors 33 indicate the extent of the shadow cast, in the parallel light 32, by body 3." Col. 6, ll. 33-35. As such, "motors 30 are then servoed to the detector outputs, so driving wedges 26 together or apart until they present a combined attenuation

PAGE 4/7 * RCVD AT 2/1/2006 12:02:46 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/29 * DNIS:2738300 * CSID:2623762994 * DURATION (mm-ss):03-02

to the radiation which has been predetermined to be suitable for a body 3 of that size." Col. 6, ll. 35-39. Thus, Moore teaches a system whereby the shadow cast by a body is used to ascertain an appropriate filter configuration. As readily shown in Figs. 2-5 of the reference, Moore discloses that the edges of the body define the shadow. That is, any differentials in thickness of the body have no impact on the size or shape of the shadow cast. Thus, it would appear that for the system of Moore there is assumption that the body is symmetrical. However, as set forth in the present application, the subject population is not symmetrical and, as a result, edge detection techniques have been shown to be inadequate.

In contrast, the claimed invention is directed to determining a region of maximum attenuation of a subject and making any adjustments necessary to an attenuation filter based, not on the detected edges of the subject, but on the location of maximum attenuation. In this regard, the attenuation filter can be adjusted such that uniform attenuation on the detector array is uniform and/or detectors do not saturate. Accordingly, claim 1 is believed to be directed to subject matter neither taught nor suggested by the art of record. Allowance of claims 1-15 is requested.

Additionally, the Examiner has asserted that the shadow-casting technique disclosed by Moore anticipates the claimed invention because "the region of maximum attenuation is the region covered by the entire patient (fig. 2a, #3) relative to the region not covered by the patient, such as air." Office Action, November 1, 2005, p. 18. Therefore, the Examiner concluded that "Moore discloses comparing (fig. 5, #36) and adjusting (fig. 5, #26 and 30) based on the determined region (fig. 2a, #3) of maximum attenuation." Id.

By definition, determining a region of maximum attenuation of the subject, the subject must have a region of non-maximum attenuation; otherwise, the subject would not have a maximum attenuation. The subject would have a constant attenuation. Additionally, the Examiner has concluded that Moore is pertinent because it discloses a technique for determining the position of a patient and, thus, determines a region of maximum attenuation (the patient) relative to non-maximum attenuation regions (air). However, "air" is not of the subject. Claim 1 calls for determining a maximum attenuation of the subject, not the maximum attenuation of everything disposed within a scanning bay. Thus, to conclude that differentiating between patient and air constitutes "determining a region of maximum attenuation of the subject" is to ignore that which is explicitly called for in the claim. Again, a region of maximum attenuation of the subject is determined. This is an element that cannot be ignored and must be given patentable weight. Therefore, Applicant believes that claim 1 is in condition for allowance.

PAGE 5/7 * RCVD AT 2/1/2006 12:02:46 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/29 * DNIS:2738300 * CSID:2623762994 * DURATION (mm-ss):03-02

Claim 16 stands rejected as being unpatentable over the combination of Toth and Horiuchi. Like Moore addressed above, Toth teaches an edge detection technique for establishing adjustments to an attenuation filter.

Toth discloses a system for estimating the physical center of a patient based on two orthogonal projections. Specifically, Toth discloses the acquisition of scout data that "is comprised of two orthogonal views from each slice position in the prescribed scan, one at a gantry angle of 0° and the other at an angle of 90°." Col. 3, ll. 33-38. After the scout data is corrected for offsets and normalized to a reference detector, the scout data is filtered to "mask out attenuation due to undesired objects such as patient table, followed by low pass filtering the scout data using an 11 point box car filter." Col. 3, ll. 43-45. Thereafter, "the edges of the patient are then located in each scout projection." Col. 3, ll. 46-47. In this regard, "[t]he attenuation data for each detector element (i) in the projection is compared to a threshold (thresh=1.5) and the lowest detector [low_0 and low_{90}] and the highest detector [$high_0$ and $high_{90}$] located at the ends of the longest contiguous string of readings above the threshold are selected as shown in FIG. 4." Col. 3, ll. 46-53. The low and high readings for both the 0° and 90° gantry angles are summed and then divided by two to give the "center 115 of the patient 15" location. Col. 3, l. 54. As such, Toth teaches determining patient edges at two orthogonal views, summing the attenuation at the patient edges for both views, and then concluding that the physical center of the patient in the two orthogonal directions is located at the mean attenuation values, respectively.

The edge detection technique disclosed by Toth has drawbacks akin to the techniques identified in the present application that the claimed invention overcomes. That is, "edge detection methods rely on identifying the center of the patient indirectly by detecting the edges of the patient, which can be particularly susceptible to error" and lead to a loss in SNR as a result of patient mis-centering. Application, pp. 5-6.

In sum, Toth teaches a technique for identifying the physical center of a patient in two orthogonal directions based on the edges of patient; such a technique is not equivalent to determining the position of maximum attenuation of a subject. Toth discloses a technique whereby the physical center of a patient is indirectly measured from the measured edges of the patient. As set forth in the present application, such an edge detection system fails to properly consider irregular subject shapes and sizes when finding "patient center". In other words, the physical center relative to edges of a patient may not represent the position of maximum attenuation. That is a shortcoming of the technique disclosed by Toth that is overcome by the invention of claim 16. Therefore, notwithstanding the teachings of Horiuchi (which the Examiner

PAGE 6/7 * RCVD AT 2/1/2006 12:02:46 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/29 * DNIS:2738300 * CSID:2623762994 * DURATION (mm-ss):03-02

solely relied upon for its teaching of a computer readable storage medium for an imaging apparatus), it is believed that claims 16-23 are in condition for allowance.

Claim 24 calls for a computer programmed to determine a region of maximum attenuation of a subject and adjust at least one of an attenuation characteristic of an attenuation filter and a table position such that a region of minimum attenuation of the attenuation filter is aligned with the region of maximum attenuation of the subject. Claim 24 stands rejected as being unpatentable over the combination of Moore and Horiuchi. As set forth herein, Moore discloses an edge detection technique that is fraught with drawbacks; namely, that such a technique assumes that the region of maximum attenuation of a subject to be imaged lies centered between the detected edges of the subject. As well-known in the art and reiterated in the present application, such an edge detection technique fails to adequately consider the anomalies and variations present in the subject population.

As stated previously, Moore determines the position of a subject to be imaged based on the shadow cast by that subject when parallel light is emitted toward the subject. As also stated previously, such a technique does not provide information as to the thickness of the subject to be imaged. As it is well-known that thicker subject cross-sections provide greater attenuation than thinner cross-sections, there is no means in the technique of Moore to ascertain where those thicker and thinner cross-sections are. They can only be assumed. Given that with the technique of Moore it is not possible to ascertain the position of thicker subject cross-sections, it is also not possible with that technique to adjust the configuration of an attenuation filter or reposition the subject such that a region of minimum attenuation of the attenuation filter is aligned with the region of maximum attenuation of the subject, as presently claimed. Thus, claims 24-30 are believed to be in condition for allowance.

Applicant appreciates the consideration of these Remarks and cordially invites the pre-appeal conference committee to call the undersigned, should it consider any matters unresolved.

Dated: February 1, 2006
Attorney Docket No.: GEMS8081.192

Respectfully submitted,

P.O. ADDRESS:
Ziolkowski Patent Solutions Group, SC
14135 North Cedarburg Road
Mequon, WI 53097-1416
262-376-5170

J. Mark Wilkinson
Registration No. 48,865
Phone 262-376-5016
jmw@zpspatents.com

PAGE 7/7 * RCVD AT 2/1/2006 12:02:46 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/29 * DNIS:2738300 * CSID:2623762994 * DURATION (mm-ss):03-02